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some resisting medium is generally considered to be the cause of this enlargement, as seen in the disks at the ends of tendrils in such vines as *Ampelopsis*.

If we regard rhizoids as organs for absorption as well as for holding a plant in place, such expansions fixed to the cellular walls of mosses ought to help materially in taking up the moisture with which swamp mosses, especially *Sphagnum*, are so well supplied. The water freely drawn up from below by capillarity, due to the peculiar structure of the cells of *Sphagnum* and the arrangement of its leaves and pendent branches, as obtained from rains and dews and held in storage, would thus be at the more ready disposal of the scale moss associated with it. Thus the rhizoid might prove to be of greater advantage as an organ for absorption than for mechanical support. It would be particularly serviceable to hepatics growing under the conditions of those found in Bergen Swamp. They were in the open and comparatively treeless portion of the swamp, much exposed to sun and wind.

The *Sphagnum* occurs in beds and hummocks, often but a few square feet in area, the central parts raised a foot or two above the water table. They make the beginning of a high moor formation. The surface of such beds is liable to considerable dryness in the hot days of midsummer when the water of the swamp is low or has wholly disappeared above ground. It becomes a trying season for such delicate structures as scale mosses, but the closely fitting enlarged attachment may help in making a more effective use of what water may be present in the bed of *Sphagnum*. As the *Lepidozia* was found in a small oval or bossy bed of this moss, the surface considerably desiccated in the August days, it seemed to show a fitting adaptation to the environment.

CHICAGO, ILL.

ADDITIONS TO THE LICHEN FLORA OF SOUTHERN CALIFORNIA NO. 7

H. E. HASSE M. D.

Lecidea bullata HASSE N. SP.

Thallus of a few small scattered ash colored squamules or absent. Apothecia substipitate, scattered or four to eight grouped, from 0.5 mm. to 1.75 mm. wide, the separate ones being the larger; disk dull black, faintly papillate, mostly slightly concave, the larger slightly convex; margin thin, gray, or blackish gray, entire or more or less sinuose, at times deeply, almost parting the disk into several lobes; epithecium subcontinuous, bluish black to almost black, gradually paling downward; thecium colorless (lower part), about 100 μ high; paraphyses separate, stout, septate, branched, the rounded top clavate-thickened and not or but slightly colored; hypothecium pallid brownish gray; asci 88 μ long, composed of an upper oblong-ovoid bullate expansion, 28 μ to 36 μ long, 12 μ to 15 μ thick, contracting to a peduncle 60 μ to 68 μ long and 8 μ to 9 μ thick; spores ovoid and oblong-ovoid, 8 μ to 12 μ long, 6 μ to 9 μ thick, simple, colorless; hymenium not horny, with iodine staining blue to sordid greenish blue, the hypothecium greenish-

yellow, the ascus contents, bullate and peduncular part, which is evidently pervious, reddish with KHO; with NO_5 dull violet purple.

On granitic rock at Eden Hot Springs, Riverside county.

Mycoporellum Hassei A. ZAHLBR. N. SP.

Thallus epiphloeodal, effuse, whitish-ash colored, thinly squamulose. Apothecia scattered, 0.4 mm. to 1 mm. wide, dull black, flattish, under the hand-lens finely papillate; paraphyses absent; asci oblong-ellipsoid, 60μ to 80μ long, 20μ to 28μ thick, the membrane about 3μ thick, the top attenuated and solidly thickened; spores 8, colorless, bilocular, oblong, 20μ to 28μ long, 8μ to 10μ thick, the lower cell slightly thinner and longer than the upper. Hymenial gelatine with iodine pale yellow, the ascus contents pale vinous, no change with KHO.

Dr. A. Zahlbruckner writes under date of Jan. 27, 1912: "Von den uebrigen Mycoporellum Arten mit 2-zelligen, farblosen Sporen durch die grosse Zahl der Muendungen des Apotheciums (15-18) unterschieden, ausserdem von *M. Lahmi* durch kleinere Sporen und von *M. ellipticum* durch die nicht zylindrischen Sporen abweichend; am naechsten kommt sie noch der *M. Eschweileri*, doch dieses hat nur wenig Ostiola."

On *Crossosoma Californicum* Nutt., Catalina Island, near Avalon, the type locality.

The next species is believed to be new to North America.

DERMATOCARPON INTESTINIFORME (Koerb.) HASSE NOV. COMB.

Endocarpion intestiniforme Koerber, Parerga. 42. 1860.

Thallus polyphyllous, cespitose, color creamy gray or sometimes with a faint bluish tint. Borders of the central squamules deflected downward, forming bullose cavities of the coarsely areolate central part. The areoles are roundish, subangular or frequently undulate wavy, each squamule containing as a rule several apothecia; the peripheral squamules are foliaceous, expanded and subimbricate. Apothecia at first immersed, later becoming prominent, the extruding perithecium dull black with a minute ostiole, the immersed part soft, globular to flattened globular, of a pale flesh color; thecium colorless; paraphyses gelatinous, indistinct; asci cylindric or bottle shaped; spores eight, blunt ellipsoid, colorless, faintly granular, 12μ - 18μ long, 6μ - 9μ thick; hymenial gelatine with iodine blue soon changing to orange-brown; no reaction with KHO.

On rocks and earth in rock crevices. North Fork of Matilja Cañon, Ventura Co., Eden Hot Springs and Palm Springs, Riverside Co., and Grand Cañon, in Arizona.

Of the following species all but the last were described in Tuckerman's Synopsis of the North American Lichens, but it has seemed worth while to give the more detailed descriptions based on my own observations.

LECANORA MELANASPIS (Ach.) Th. Fr. var. *alphoplaca* (Wahlenb.) Th. Fr.

Thallus crustaceous at the center, closely affixed and covered by numerous apothecia, becoming lobed towards the periphery, the lobes oblong or rounded, entire or variously divided and even stellate in outline, dull brownish gray with a more or less marked whitish margin, the peripheral lobes loosely affixed and whitish beneath, each lobe containing from one to several apothecia; apothecia,

becoming large, from 0.5 to 1.5 mm. wide, disk at first plane with an entire elevated margin, finally convex and the margin obsolete, darker in color than the thallus and at last dull black, a few disks showing a faint whitish bloom in the center but the greater number naked. Epithecium subcontinuous, brown; thecium colorless, 64μ to 72μ high; paraphyses coherent, thick (2μ to 3μ), septate, as seen after KHO, not furcate; asci clavate, 40μ long, 14μ thick, nearly reaching the colored epithecium; hypothecium colorless; spores 8, ovoid, 9μ to 11μ long, 5μ to 6μ thick, epispore thin and indistinct, the spore contents minutely granular, giving the spore-containing ascus the appearance of an *Acarospora*. Hymenial gelatine with iodine blue, rapidly changing to a rich dark copper red, the epithecium not becoming stained; KHO gives finally a sordid orange color; no change with NO_5 except a paling of the epithecium.

On quartz at Eden Hot Springs, Riverside County.

CALOPLACA POLLINII (Mass.) Jatta.

Placodium ferrugineum (Huds.) Hepp var. *pollinii* Tuck. Syn. N. A. L. 1: 177. 1882.

Thallus of minute, dispersed gray granules or obsolete; apothecia small, adnate, not over 0.5 mm. wide, disk flat, dull brown-black; epithecium granulose, pale brownish; thecium colorless; paraphyses loosely coherent, their tips globular; hypothecium colorless; asci clavate or oblong; spores 8, oblong-ellipsoid, colorless, polarilocular with a faint connecting tube, becoming plainer after KHO; 12μ to 17μ long, 5μ to 7μ thick; all structures stain blue with iodine. The mature apothecia are biatorine in aspect, but those of a younger state have a thin and inconspicuous yet distinguishable, thalline margin.

On dead wood at Eden Hot Springs, Riverside County.

LECIDEA (Section *Biatora*) *LEUCOPHAEA* (Flk.) Th. Fr. form *GENUINA* (Koerb.) Th. Fr.

Thallus thin, pale gray to dirty white, of small, dispersed, flat squamules, uniting in places to an areolate crust, KHO, $\text{Ca}(\text{ClO})_2$; medullary hyphae giving no reaction with iodine. Apothecia subinnate, later sessile, from 0.3 to 1.0 mm. wide; disk flat with a subprominent margin, at length becoming convex and the margin obsolete, in color brown-black when dry, red-brown when moist, now and then conglomerate; epithecium subcontinuous, bluish black or also yellowish brown; thecium colorless, 60μ to 80μ high; paraphyses loosely coherent or separate, entire, simple, slightly thickened above; hypothecium colorless or of a pale straw color; asci clavate, eight-spored; spores colorless, simple, oblong-ovoid, 12μ to 17μ long, 7μ to 10μ thick, apparently falsely and irregularly septate, but clearing after the action of KHO; hymenial gelatine with iodine blue, soon dingy brownish and the asci vinous red; NO_5 staining the epithecium a sordid crimson.

On sandstone, Topanga Cañon, Santa Monica Range.

SCHIZOPELTE CALIFORNICA Th. Fr. Specimens have been communicated to me by Mrs. Blanche Trask, who collected it on San Clemente Island in 1902, and the species has recently been found by me on beach rocks on Catalina Island and also on rocks, but sterile, near Newport, Orange County. In both these

last stations the apothecia are less developed than in the San Clemente specimen; the spores in both insular plants are alike.

BUELLIA INQUILINA Tuck. Apothecia apparently parasitic upon the thallus of *Lecanora saxicola* (Poll.) Ach., occupying the central part of the host lichen, the color of which is changed to a sordid grayish brown, while the peripheral unoccupied lobes retain their normal color. The apothecia are sessile, solitary or, mostly, grouped and contiguous on a squamule, from 0.3 to 0.75 mm. wide; disk flat to slightly convex, slightly papillate, black, the medium thick margin also black with a slight brownish tinge; epithecium subcontinuous, of the color of Van Dyke brown; thecium colorless, 60μ to 64μ high; paraphyses loose or free with globular tips; asci clavate and inflated clavate; spores 8, brown, bilocular, ovoid-ellipsoid, both ends rounded, each locus with a round spot, slightly constricted, 12μ to 16μ long, 7μ to 9μ thick; hypothecium concolorous with the epithecium; hymenial gelatine with iodine deep blue, the asci changing to a dark copper-red, the tops of some asci remaining blue; no change with KHO. Not having an authentic specimen for comparison, the above name of Tuckerman (Syn. 2: 105) is given provisionally, the spore measurements agreeing well with the description.

On Quartz near Eden Hot Springs, Riverside County.

ARTHOPYRENIA BIFORMIS (Borr.) Muell. Arg.

Verrucaria biformis Borrer.

Thallus silvery gray, finely squamulose-pulverulent, diffuse; apothecia scattered, prominent, semiglobular or somewhat subconical, perithecium dull black or shining, ostiole minute, punctiform depressed; paraphyses free, slender, distantly branching; asci cylindric, 100μ long, 12μ thick, eight-spored; spores ellipsoid, bilocular, colorless, 12μ to 17μ long, 7μ to 8μ thick, the partition often oblique, dividing the spore unsymmetrically; hypothecium pallid. Iodine does not stain the ascus membrane, but its contents become vinous red, the thecium and paraphyses yellow.

Catalina Island on *Heteromeles arbutifolia* (Poir.) Roem.

Determined by Dr. A. Zahlbruckner.

REVIEWS

LEOPOLD LOESKE: Studies in the Comparative Morphology and the Phylogenetic Taxonomy of Mosses. Berlin, 1910*

In German. A profoundly interesting treatise of 222 pages, with a Foreword, an Introduction, 37 meaty chapters, and a Concluding Word: all replete with suggestions, largely based on years of field observations, illuminating the phyletic relations of mosses. The author proceeds in all his discussions with refreshing courage and independence of judgment. Servility is foreign to Dr. Loeske's nature. The criticisms and strictures he makes on current moss systems and their authors show him a worthy and able, but also a courteous and

* See 3rd Cover.